Theoretical investigation of InP-based sub-wavelength plasmonic waveguides

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Abstract

Over the past decade, plasmonic nanoscale devices, which introduce negative dielectric permittivity to localize and guide light, have been extensively investigated and revealed to be a promising candidate for next-generation highly integrated nanophotonic circuits. In comparison to most conventional optical waveguiding structures, plasmonic devices may offer deep sub-diffraction limit light confinement and intrinsic broadband behavior. In this work, we theoretically investigate the optical properties of InP-based sub-wavelength plasmonic waveguides. The mode and light transmission properties of the plasmonic waveguides are simulated with the finite-element method (FEM). The results are useful for designing and realizing in the future InP-based active nanophotonic devices, such as optical transistors and lasers.